DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 06/30/2010 have been fully considered but they are not persuasive.

2. The applicant argued features in the claims, i.e. A method of communication in a time division duplex (TDD) satellite communication system comprising at least one satellite and a plurality of terrestrial terminals; the method comprising allocating time division multiple access (TDMA) time slots for transmission between the satellite and any one of the plurality of terminals, such that for any given terminal, transmit time slots for transmission to the satellite and receive time slots for reception from the satellite are separated in time; wherein propagation delay is not an exact number of multiples of frame length; wherein an assigned time delay between transmit and receive time slots at the any one terminal is small compared with round trip propagation delay; and wherein, when the transmit time slot for one terminal causes a transmission from that one terminal to be received at another terminal overlapped in time with a receive time slot allocated for the other terminal, then those two terminals are spaced apart in distance, such that an interference path between the two terminals is negligible, reads upon Rouffet in view of Emmons, as follows.

Rouffet is discussing a space telecommunications where time-division duplex is used. Therefore, Rouffet is showing the limitation of "**Time division duplex (TDD) satellite communication system**". Rouffet discusses TDD communications system

between low-orbit satellites and terminals. Therefore, Rouffet is showing the limitation of "**at least one satellite and a plurality of terrestrial terminals**". Rouffet is discussing **allocating time division multiple access TDMA-TDD**. Therefore, Rouffet is showing the limitation of "**allocating time division multiple access (TDMA) time slots for transmission between the satellite and any one of the plurality of terminals**". Rouffet discusses where for a given transmission, the corresponding reception occurs one frame later therefore the receive and transmit time slots are separated in time. Therefore, Rouffet is showing the limitation of "**that for any given terminal, transmit time slots for transmission to the satellite and receive time slots for reception from the satellite are separated in time**". Rouffet discusses where propagation delay is different because the locations of the mobile stations as some are farthest from the satellite. Therefore, Rouffet is showing the limitation of "**wherein propagation delay is not an exact number of multiples of frame length**". Rouffet discusses where for a given transmission, the corresponding reception occurs one frame later, and the signal must travel via satellite. Therefore, Rouffet is showing the limitation of "**wherein an assigned time delays between the transmit and receive time slots at the any one terminal is small compared with round trip propagation delay**". Rouffet is discussing where transmissions in each of the beams are linked in time in the same way as the instants of reception. Therefore, Rouffet is showing the limitation of "**when the transmit time slot for one terminal causes a transmission from that one terminal to be received at another terminal overlapped in time with a receive time slot allocated for the other terminal** ". Rouffet discusses two

terminals are placed in different regions of beams, such that an interference path between the two terminals is negligible. Therefore, Rouffet is showing the limitation of "**at least one satellite and a plurality of terrestrial terminals**".

Rouffet showed different regions however it did not show space apart. As a result Emmons, Jr. was used to show spatial separation to accommodate TDD links therefore Time division duplex (TDD) satellite communication system and spacing apart (**abstract** and **col. 5 lines 19-42).**

Regarding the applicants arguments on dependent claims limitations, those limitation where shown by Rouffet in view of Emmons, Jr. where Emmons, Jr. show receiving, by the satellite, location information from the first and second terminals.

Regarding the applicants arguments on combination of references, all references were analogous and performing similar tasks and therefore are combinable.

Regarding the applicants argument on motivation, the motivation to combine was shown in the background of the secondary reference.

Therefore the argued features where read upon the cited references or are written broad enough that they read upon the cited references as follows.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rouffet et al. US 5,668,556 in view of Emmons, Jr. et al. US 6,570,858.

Regarding claim 1, Rouffet discloses a method of communication in a Time division duplex (TDD) satellite communication system **(see abstract)**. Rouffet discloses at least one satellite and a plurality of terrestrial terminals (**abstract, col. 1, lines 9-13, where Rouffet discusses TDD communications system between low-orbit satellites and terminals**). Rouffet discloses allocating time division multiple access (TDMA) time slots for transmission between the satellite and any one of the plurality of terminals (**col. 1, lines 43-49-, col. 4 lines 35-55, allocating time division multiple access TDMA-TDD**) Rouffet discloses such that for any given terminal, transmit time slots for transmission to the satellite and receive time slots for reception from the satellite are separated in time (**Fig. 3 and col. 7, lines 10-30, where for a given transmission, the corresponding reception occurs one frame later therefore the receive and transmit time slots are separated in time**). Rouffet discloses wherein propagation delay is not an exact number of multiples of frame length (**col. 7, line 11-26 – where propagation delay is different because location of the mobile stations as some are farthest from the satellite**). Rouffet discloses wherein an assigned time delay between transmit and receive time slots at the any one terminal is small compared with round trip propagation delay (**col. 7, lines 27-30 where for a given transmission, the corresponding reception occurs one frame later, and the signal**

must travel via satellite, therefore time delay is small compared with round trip propagation delay). Rouffet discloses when the transmit time slot for one terminal causes a transmission from that one terminal to be received at another terminal overlapped in time with a receive time slot allocated for the other terminal **(see col. 6 lines 65-67, col. 7 lines 1-20 where transmissions in each of the beams are linked in time in the same way as the instants of reception).** Rouffet disclose then those two terminals are placed in different regions of beams, such that an interference path between the two terminals is negligible **(see col. 6 lines 65-67, and col. 7 lines 1-35, where Rouffet discusses a spatial separation to implement TDD).** .

Rouffet discloses different regions, but does not specifically disclose spaced apart. However, Emmons, Jr., teaches Time division duplex (TDD) satellite communication system and spacing apart **((see abstract, col. 5 lines 19-42, where Emmons Jr., discusses spatial separation to accommodate TDD links).** .

At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify the invention of Rouffet and using special separation, as taught by Emmons Jr., thereby adding to spectral efficiency, as discussed by Emmons Jr., **(col. Lines 48-53).**

Regarding claim 10, Rouffet discloses a method **(see abstract, and col. 1 lines 9-13, where Rouffet discusses a method in a Satellite system).** Rouffet discloses allocating, by a satellite, a plurality of time slots on a frequency for transmission to and reception from a plurality of terminals **(see col. 1 lines 9-13, and col. 5 lines 5-8).**

Rouffet discloses the plurality of time slots provide Time division duplexing (TDD)/time division multiple access (TDMA) time slots on the frequency (**abstract, and col. 4 lines 34-57, where Rouffet discusses TDMA, TDD communications system between low-orbit satellites and terminals therefore satellite and multiple terminals**). Rouffet discloses transmitting, by the satellite to a first of the plurality of terminals, in one of the plurality of time slots (**col. 1, lines 9-13, col. 1 lines 43-49-, and col. 5 lines 5-10, allocating time division multiple access TDMA-TDD**). Rouffet discloses receiving, by the satellite from a second of the plurality of terminals, in another of the plurality of time slots **(see Fig. 3, col. 2 lines 40-47 and col. 7, lines 11-16, 27-30, where Rouffet discusses TDD communications in a GSM mobile phone, Satellite system, therefore mobiles communicating in different time slots)**. Rouffet discloses wherein when the first and second terminals are in different zones or regions a predetermined distance the first terminal transmits to the satellite over the frequency at a same time as the second terminal receives from the satellite over the frequency **(see col. 6 lines 55-67, and col. 7 lines 1-22, where Rouffet discusses different zones to accommodate TDD communications TDMA, TDD being slots on same frequency but staggered for transmit and receive**

Rouffet discloses different zones, but does not specifically disclose the terminals are spaced apart. However, Emmons, Jr. teaches the terminals are spaced apart **((see abstract, col. 5 lines 19-42, where Emmons Jr., discusses spatial separation to accommodate TDD links).**

At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify the invention of Rouffet and using special separation, as taught by Emmons Jr., thereby adding to spectral efficiency, as discussed by Emmons Jr., **(col. Lines 48-53)**

Regarding claim 2, Rouffet discloses signals between the terminals and the satellite are synchronized at the satellite (**col. 4, lines 63 col. 5, line** 4).

Regarding claim 3, Rouffet discloses alternate time slots at the satellite are used for transmission and reception (**see Fig. 3**).

Regarding claim 4, Rouffet discloses wherein the terminals use navigational information to estimate their propagation delay to the satellite; and thus to determine the time required to transmit into an allocated time slot (**col. 6, lines 13-18**).

Regarding claim 5, the combination of above discloses wherein the satellite transmits ephemeris data to the terminals to aid in determining the propagation delay (**see above**).

Regarding claim 6, Rouffet discloses wherein the position of each terminal is determined by the satellite, using location data provided by each terminal delay (**col. 2, lines 63 – col. 4, line 4**).

Regarding claim 7, Rouffet discloses wherein downlink timeslots are allocated to terminals at random (**See Fig. 4**).

Regarding claim 8, Rouffet discloses wherein uplink timeslots are allocated in order to avoid a transmission at one terminal being received by another terminal at a time for which the other terminal has been allocated a receive time slot (**See Fig. 3**).

Regarding claim 9, the combination of above discloses wherein terminal receive time slots are allocated randomly; wherein allocation of terminal transmit time slots includes the steps of: calculating the minimum distance between a transmitting terminal and a receiving terminal which receives the transmission; repeating this calculation for all terminal transmit time slots; repeating the calculation for all terminals; calculating the resulting interference if each terminal used its worst terminal time slot; ranking the terminals according to which cause the worst interference with another terminal; and starting from the worst terminal, allocating the best time slot for that terminal, discarding terminal transmit time slots where transmit and receive time slots overlap in the same terminal (see above).

Regarding claim 11, Emmons, Jr. teaches receiving, by the satellite, location information from the first and second terminals, wherein the received location information is used for determining whether the first and second terminals are spaced apart the predetermined distance **(col. 8, lines 64—col. 9, line 7).**

Regarding claim 12, Emmons, Jr. teaches wherein the plurality of time slots are arranged into a plurality of frames, each of the plurality of frames having a duration less than a duration of a round trip propagation delay between at least one of the plurality of terminals and the satellite **(See Fig. 5).**

Conclusion

1. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

2. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Amanuel Lebassi, whose telephone number is (571) 270-5303. The Examiner can normally be reached on Monday-Thursday from 8:00am to 5:00pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Nick Corsaro can be reached at (571) 272-7876. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist/customer service whose telephone number is (571) 272-2600.

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11/05/2010
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